

WHAT IS CLAIMED IS:

- 1 1. A device, comprising:
2 an input microstrip line and an output microstrip line each respectively
3 having a length less than one-quarter of a target wavelength corresponding to a
4 target operating frequency, a characteristic impedance greater than a target source
5 impedance, and a series inductance at the target operating frequency; and
6 an electro-absorption modulator having a signal electrode with a length
7 less than one-quarter of the target wavelength, a characteristic impedance less
8 than the target source impedance, and a shunt capacitance at the target operating
9 frequency;
10 wherein the input microstrip line, output microstrip line, and the electro-
11 absorption modulator are incorporated into a distributed low-pass filter
12 transmission line circuit having a characteristic impedance substantially matching
13 the target source impedance at the target operating frequency.
- 1 2. The device of claim 1, wherein the input microstrip line is
2 connected between an input shunt capacitance and the electro-absorption
3 modulator and the output microstrip line is connected between an output shunt
4 capacitance and the electro-absorption modulator.
- 1 3. The device of claim 2, wherein the series inductances of the input
2 and output microstrip lines, the input and output shunt capacitances, and the
3 shunt capacitance of the signal electrode enable the distributed low-pass filter
4 transmission line circuit to substantially match the target source impedance at the
5 target operating frequency.
- 1 4. The device claim 2, wherein the output shunt capacitance comprises
2 an output bonding pad connected in parallel with a shunt capacitor.
- 1 5. The device of claim 1, wherein the input microstrip line has a series
2 inductance providing peaking of the characteristic impedance of the low-pass
3 filter transmission line circuit near the target operating frequency.

1 6. The device of claim 1, wherein the signal electrode of the electro-
2 absorption modulator has a distributed traveling wave structure comprising
3 multiple spaced-apart signal electrode segments connected in series, with each
4 pair of signal electrode segments being connected by a respective microstrip line.

1 7. The device of claim 6, wherein each signal electrode segment has a
2 length less than one-quarter of the target wavelength, a characteristic impedance
3 less than a target source impedance, and a shunt capacitance at the target
4 operating frequency.

1 8. The device of claim 6, wherein each microstrip line connecting the
2 signal electrode segments has a length less than one-quarter of the target
3 wavelength, a characteristic impedance greater than a target source impedance,
4 and a series inductance at the target operating frequency.

1 9. The device of claim 6, wherein the signal electrode segments are
2 formed of respective electrically conducting regions of a layer electrically isolated
3 from each other by electrically insulating regions of the layer.

1 10. The device of claim 1, wherein the target source impedance is 50
2 ohms.

1 11. The device of claim 1, wherein each microstrip line includes an
2 electrically insulating layer disposed between electrically conducting layers.

1 12. The device of claim 1, wherein the signal electrode is formed on a
2 ridge structure.

1 13. A device, comprising an electro-absorption modulator having a
2 signal electrode with a distributed traveling wave structure comprising multiple
3 spaced-apart signal electrode segments connected in series with each pair of
4 signal electrode segments connected by a respective microstrip line.

1 14. The device of claim 13, wherein each microstrip line connecting
2 signal electrode segments has a length less than one-quarter of a target
3 wavelength corresponding to a target operating frequency, a characteristic

4 impedance greater than a target source impedance, and a series inductance at the
5 target operating frequency.

1 15. The device of claim 13, wherein each signal electrode segment has a
2 length less than one-quarter of a target wavelength corresponding to a target
3 operating frequency, a characteristic impedance less than a target source
4 impedance, and a shunt capacitance at the target operating frequency.

1 16. The device of claim 15, further comprising an input microstrip line
2 and an output microstrip line each respectively having a length less than one-
3 quarter of the target wavelength, a characteristic impedance greater than the
4 target source impedance, and a series inductance at the target operating
5 frequency.

1 17. The device of claim 16, wherein the input microstrip line, output,
2 microstrip line, and the electro-absorption modulator are incorporated into a
3 distributed low-pass filter transmission line circuit having a characteristic
4 impedance substantially matching the target source impedance at the target
5 operating frequency.

1 18. The device of claim 16, wherein the input microstrip line is
2 connected between an input shunt capacitance and the electro-absorption
3 modulator and the output microstrip line is connected between an output shunt
4 capacitance and the electro-absorption modulator.

1 19. The device of claim 18, wherein the series inductances of the input
2 and output microstrip lines, the input and output shunt capacitances, and the
3 shunt capacitance of the signal electrode enable the distributed low-pass filter
4 transmission line circuit to substantially match the target source impedance at the
5 target operating frequency.

1 20. The device claim 18, wherein the output shunt capacitance
2 comprises an output bonding pad connected in parallel with a shunt capacitor.